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Original Research Article

Comparative Study of LigaSure Haemorrhoidectomy versus Conventional Open Haemorrhoidectomy in Management of Grade III and IV Haemorrhoids

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Abstract

Background: Haemorrhoidal disease is a common anorectal condition, and surgical intervention is recommended for symptomatic grade III and IV haemorrhoids. Conventional open haemorrhoidectomy (Milligan–Morgan technique) is widely practiced but is associated with significant postoperative pain and longer recovery. LigaSure haemorrhoidectomy, a modern technique utilizing bipolar electrothermal vessel sealing, has been introduced to reduce operative time, blood loss, and postoperative discomfort.

Aim: To compare the clinical outcomes of LigaSure haemorrhoidectomy with conventional open haemorrhoidectomy in the management of grade III and IV haemorrhoids.

Methods: This prospective comparative study included 100 patients diagnosed with grade III and IV haemorrhoids who required surgical treatment. Patients were randomly divided into two groups: Group A (50 patients) underwent LigaSure haemorrhoidectomy and Group B (50 patients) underwent conventional open haemorrhoidectomy. The parameters evaluated included operative time, intraoperative blood loss, and postoperative pain using Visual Analog Scale (VAS), duration of hospital stay, postoperative complications, and time to return to normal activities.

Results: The mean operative time and intraoperative blood loss were significantly lower in the LigaSure group compared with the conventional open haemorrhoidectomy group. Postoperative pain scores were also significantly lower in patients undergoing LigaSure haemorrhoidectomy. The duration of hospital stay and time to return to normal daily activities were shorter in the LigaSure group. Postoperative complications such as bleeding and urinary retention were less frequent in the LigaSure group, although the difference was not statistically significant.

Conclusion: LigaSure haemorrhoidectomy is a safe and effective alternative to conventional open haemorrhoidectomy for the treatment of grade III and IV haemorrhoids. It offers advantages including reduced operative time, minimal blood loss, decreased postoperative pain, and faster recovery.

Keywords: Haemorrhoids, LigaSure haemorrhoidectomy, Open haemorrhoidectomy, Milligan–Morgan procedure, Comparative study.

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Introduction

Haemorrhoidal disease is one of the most common anorectal disorders encountered in surgical practice. It affects nearly 4–5% of the general population and is more prevalent in adults between the ages of 45 and 65 years.

Haemorrhoids represent symptomatic enlargement and distal displacement of the normal anal cushions, which are vascular structures composed of arteriovenous channels and connective tissue located in the anal canal. Common symptoms include bleeding per rectum, prolapse, pain, pruritus, and mucous discharge, which significantly affect the quality of life of affected individuals. [1]

Haemorrhoids are commonly classified according to the degree of prolapse using the Goligher classification. Grade I haemorrhoids bleed but do not prolapse, grade II haemorrhoids prolapse but reduce spontaneously, grade III haemorrhoids prolapse and require manual reduction, and grade IV haemorrhoids are irreducible and remain prolapsed.

Surgical treatment is usually indicated for grade III and IV haemorrhoids or for patients with persistent symptoms despite conservative therapy. [2] Conventional open haemorrhoidectomy described by Milligan and Morgan remains the gold standard surgical procedure for advanced haemorrhoids. Although effective, the procedure is associated with significant postoperative pain, longer operative time, bleeding, and delayed wound healing. Postoperative pain remains the most important drawback of the conventional technique and contributes to prolonged hospital stay and delayed return to normal activities. [3]

In recent years, several newer surgical techniques have been developed to reduce postoperative morbidity associated with haemorrhoidectomy. LigaSure haemorrhoidectomy is a modern technique that utilizes bipolar electrothermal energy to seal blood vessels and tissue bundles up to 7 mm in diameter. This system allows simultaneous vessel sealing and tissue division with minimal thermal spread to surrounding tissues. As a result, the technique may reduce operative time, intraoperative blood loss, and postoperative pain compared with conventional haemorrhoidectomy. [4] Several clinical studies and randomized controlled trials have reported that LigaSure haemorrhoidectomy provides better postoperative outcomes with reduced operative time, less postoperative pain, and quicker recovery compared to conventional open haemorrhoidectomy. However, the availability and cost of the LigaSure device remain limiting factors in many healthcare settings. [5]

Aim and Objectives

Aim: To compare the clinical outcomes of LigaSure haemorrhoidectomy with conventional open haemorrhoidectomy (Milligan–Morgan technique) in the management of grade III and IV haemorrhoids.

Objectives

1. To compare the operative time between LigaSure haemorrhoidectomy and conventional open haemorrhoidectomy.
2. To evaluate the intraoperative blood loss in both surgical techniques.
3. To assess the postoperative pain using the Visual Analog Scale (VAS) in patients undergoing LigaSure haemorrhoidectomy and conventional open haemorrhoidectomy.
4. To compare the duration of hospital stay between the two procedures.
5. To evaluate the postoperative complications, including bleeding, urinary retention, wound infection, and anal stenosis in both groups.
6. To compare the time required to return to normal daily activities after surgery in both techniques.
7. To determine the overall effectiveness and safety of LigaSure haemorrhoidectomy compared with conventional open haemorrhoidectomy.

Materials and Methods

Study Design: This study was designed as a prospective comparative study to evaluate the outcomes of LigaSure haemorrhoidectomy and conventional open haemorrhoidectomy in the management of grade III and IV haemorrhoids.

Study Setting: The study was conducted in the Department of General Surgery at Pacific Institute of Medical Sciences.

Study Duration: The study was conducted over a period of 15 months from April 2024 to June 2025.

Sample Size: A total of 100 patients diagnosed with grade III and IV haemorrhoids and requiring surgical management were included in the study.

Study Groups: The patients were divided into two groups:

- **Group A:** 50 patients underwent LigaSure haemorrhoidectomy.
- **Group B:** 50 patients underwent conventional open haemorrhoidectomy (Milligan–Morgan technique).

Inclusion Criteria

1. Patients aged 18–70 years.
2. Patients diagnosed with grade III and grade IV haemorrhoids.
3. Patients presenting with symptomatic haemorrhoids requiring surgical intervention.
4. Patients who gave written informed consent for participation in the study.

Exclusion Criteria

1. Patients with grade I and grade II haemorrhoids.
2. Patients with thrombosed external haemorrhoids.
3. Patients with associated anorectal diseases such as fissure-in-ano, fistula-in-ano, or anorectal malignancy.
4. Patients with inflammatory bowel disease.
5. Patients with bleeding disorders or severe systemic illness.
6. Patients with history of previous anorectal surgery.

Preoperative Evaluation: All patients underwent detailed clinical history and physical examination, including digital rectal examination and proctoscopy. Routine investigations such as complete blood count, blood sugar levels, renal

function tests, coagulation profile, and viral markers were performed prior to surgery. Written informed consent was obtained from all patients before the procedure.

Surgical Procedure

LigaSure Haemorrhoidectomy: In Group A, haemorrhoidectomy was performed using the LigaSure vessel sealing system. The haemorrhoidal pedicle was grasped and sealed using bipolar electrothermal energy, followed by excision of the haemorrhoidal tissue without the need for suture ligation. Haemostasis was achieved through vessel sealing.

Conventional Open Haemorrhoidectomy: In Group B, the Milligan–Morgan open haemorrhoidectomy technique was performed. The haemorrhoidal tissue was excised, and the vascular pedicle was ligated with absorbable sutures. The wounds were left open to heal by secondary intention.

Postoperative Care: All patients received standard postoperative management including analgesics, antibiotics, stool softeners, and sitz baths. Patients were monitored for postoperative complications during their hospital stay.

Parameters Assessed

The following parameters were evaluated:

1. **Operative time (minutes)**
2. **Intraoperative blood loss (ml)**
3. **Postoperative pain assessed using the Visual Analog Scale (VAS)**
4. **Duration of hospital stay (days)**
5. **Postoperative complications**, including:
    - Bleeding
    - Urinary retention
    - Wound infection
    - Anal stenosis
6. **Time required to return to normal daily activities**

Follow-Up: Patients were followed up at 1 week, 2 weeks, and 1 month postoperatively to assess wound healing and detect any postoperative complications.

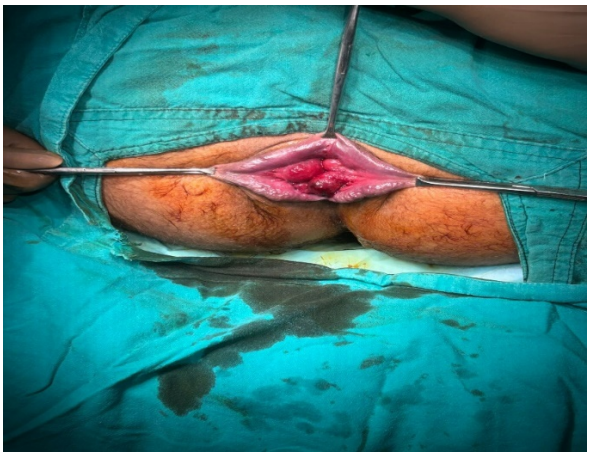

Figure 1: Showing grade IV internal haemorrhoids

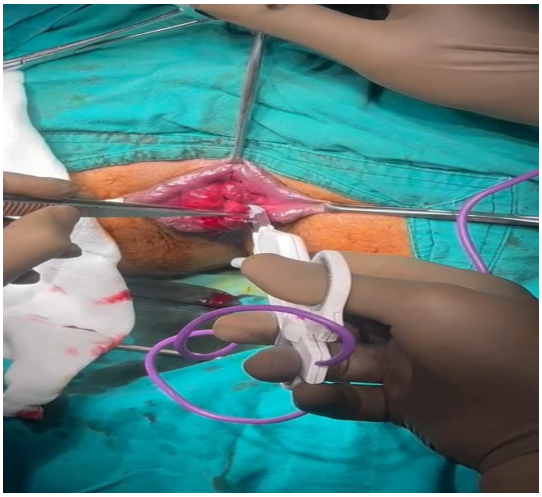

Figure 2: Ligasure haemorrhoidectomy

Review of Literature: Haemorrhoidal disease is one of the most common anorectal disorders encountered in surgical practice. It is characterized by symptomatic enlargement and distal displacement of the anal cushions. The prevalence of haemorrhoids in the general population is approximately 4–5%, and the condition commonly presents with symptoms such as bleeding per rectum, prolapse, pain, itching, and mucous discharge.6

Haemorrhoids are classified according to the Goligher classification, which divides them into four grades depending on the degree of prolapse. Grade I haemorrhoids bleed without prolapse, grade II prolapse but reduce spontaneously, grade III prolapse and require manual reduction, and grade IV remain irreducible. Surgical management is usually indicated in grade III and IV haemorrhoids or in patients with persistent symptoms despite conservative treatment. [7] The Milligan–Morgan open haemorrhoidectomy, first described in 1937, remains the gold standard surgical treatment for advanced haemorrhoids. The procedure involves excision of the haemorrhoidal tissue with ligation of the vascular pedicle while leaving the wounds open to heal by secondary intention. Although effective, this procedure is associated with significant postoperative pain, bleeding, and delayed wound healing. [8]

In order to reduce postoperative morbidity, newer surgical techniques have been introduced. One such technique is LigaSure haemorrhoidectomy, which uses bipolar electrothermal energy to seal blood vessels and tissue bundles. The LigaSure device provides effective vessel sealing with minimal thermal spread, thereby reducing intraoperative bleeding and operative time. [9] Muzi MG et al. conducted a randomized clinical trial in Italy from 2003 to 2005 comparing LigaSure haemorrhoidectomy with conventional diathermy haemorrhoidectomy. The study demonstrated that the LigaSure technique significantly reduced operative time and postoperative pain compared with the conventional method. [10]

Tan KY et al. performed a randomized controlled trial in Singapore between 2004 and 2006 comparing LigaSure haemorrhoidectomy with conventional haemorrhoidectomy. They reported that LigaSure haemorrhoidectomy was associated with less intraoperative blood loss, shorter operative time, and faster recovery. [11]

Khanna R et al. conducted a prospective comparative study in India between 2007 and 2009 and found that patients undergoing LigaSure haemorrhoidectomy experienced significantly less postoperative pain and earlier return to normal activities compared with those undergoing conventional open haemorrhoidectomy. [12]

Thus, several studies have demonstrated that LigaSure haemorrhoidectomy offers advantages such as reduced operative time, minimal intraoperative blood loss, decreased postoperative pain, and faster recovery when compared with conventional open haemorrhoidectomy. However, the higher cost of the LigaSure device and availability of equipment remain important considerations in many healthcare settings. Therefore, further studies are required to evaluate its effectiveness and applicability in different clinical settings.

Table 1: Age Distribution of Patients

Age Group (Years)	LigaSure Group (n=50)	Open Haemorrhoidectomy Group (n=50)	Total
21–30	6	5	11
31–40	10	11	21
41–50	16	15	31
51–60	12	13	25
>60	6	6	12
Total	**50**	**50**	**100**

Table 2: Gender Distribution

Gender	LigaSure Group (n=50)	Open Haemorrhoidectomy Group (n=50)	Total
Male	32	32	64
Female	18	18	36
Total	**50**	**50**	**100**

Table 3: Mean Operative Time

Procedure	Mean Operative Time (minutes)	Standard Deviation	p-value
LigaSure Haemorrhoidectomy	18.4	±4.6	
Open Haemorrhoidectomy	32.7	±6.8	**<0.001**

Table 4: Intraoperative Blood Loss

Procedure	Mean Blood Loss (ml)	Standard Deviation	p-value
LigaSure Haemorrhoidectomy	12.6	±5.4	
Open Haemorrhoidectomy	36.3	±8.7	**<0.001**

Table 5: Postoperative Pain (VAS Score)

Procedure	Mean VAS Score	Standard Deviation	p-value
LigaSure Haemorrhoidectomy	3.1	±1.2	
Open Haemorrhoidectomy	6.4	±1.5	**<0.001**

Table 6: Duration of Hospital Stay

Procedure	Mean Hospital Stay (Days)	Standard Deviation	p-value
LigaSure Haemorrhoidectomy	1.3	±0.6	
Open Haemorrhoidectomy	2.5	±0.8	**<0.01**

Table 7: Postoperative Complications

Complication	LigaSure Group (n=50)	Open Group (n=50)	p-value
Bleeding	1 (2%)	4 (8%)	>0.05
Urinary Retention	2 (4%)	5 (10%)	>0.05
Wound Infection	1 (2%)	3 (6%)	>0.05
Anal Stenosis	0 (0%)	1 (2%)	>0.05

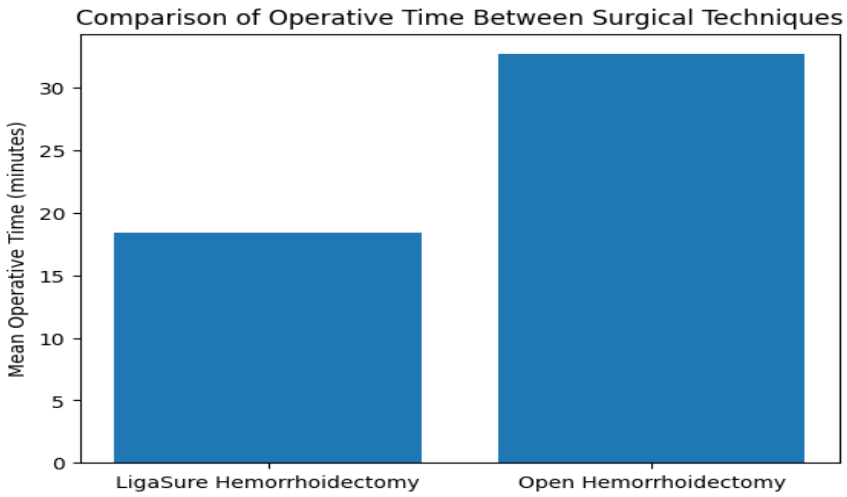

Figure 3: Comparison of operative time between surgical techniques

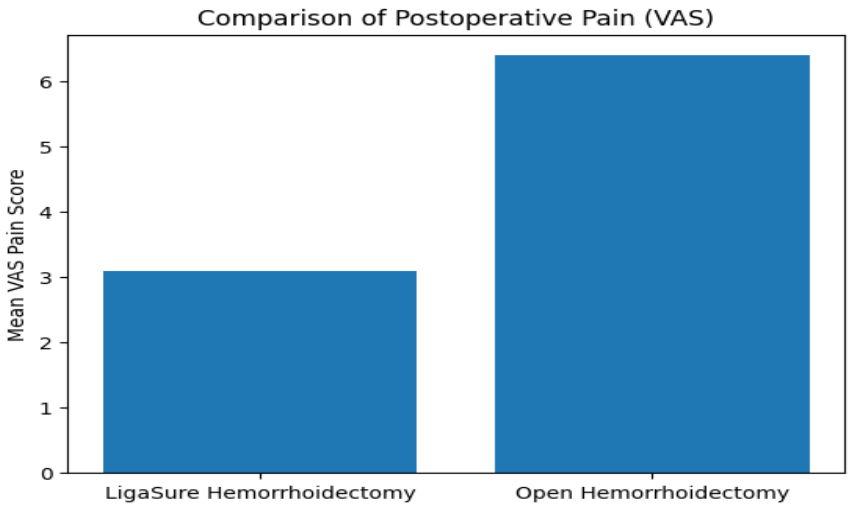

Figure 4: Comparison of postoperative Pain (VAS)

Conclusion

The present study compared the outcomes of LigaSure haemorrhoidectomy and conventional open haemorrhoidectomy (Milligan–Morgan technique) in the management of grade III and IV haemorrhoids among 100 patients treated at the Department of General Surgery, Pacific Institute of Medical Sciences, Udaipur, from April 2024 to June 2025.The results of this study demonstrated that LigaSure haemorrhoidectomy offers significant advantages over conventional open haemorrhoidectomy.

Patients who underwent LigaSure haemorrhoidectomy had shorter operative time, significantly less intraoperative blood loss, and lower postoperative pain scores. In addition, the duration of hospital stay was shorter and patients returned to their normal daily activities earlier compared with those who underwent conventional open haemorrhoidectomy.

Postoperative complications such as bleeding, urinary retention, wound infection, and anal stenosis were observed in both groups; however, the incidence was lower in the LigaSure group, although the difference was not statistically significant.

Therefore, LigaSure haemorrhoidectomy is a safe, effective, and minimally invasive alternative to conventional open haemorrhoidectomy for the surgical management of grade III and IV haemorrhoids. The procedure provides better postoperative outcomes and faster recovery, making it a favorable surgical option despite the higher cost of the equipment.

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